

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CHANNEL VEGETATION (ACRE)

CODE 322

MONTANA TECHNICAL GUIDE

SECTION IV

DEFINITION

Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.

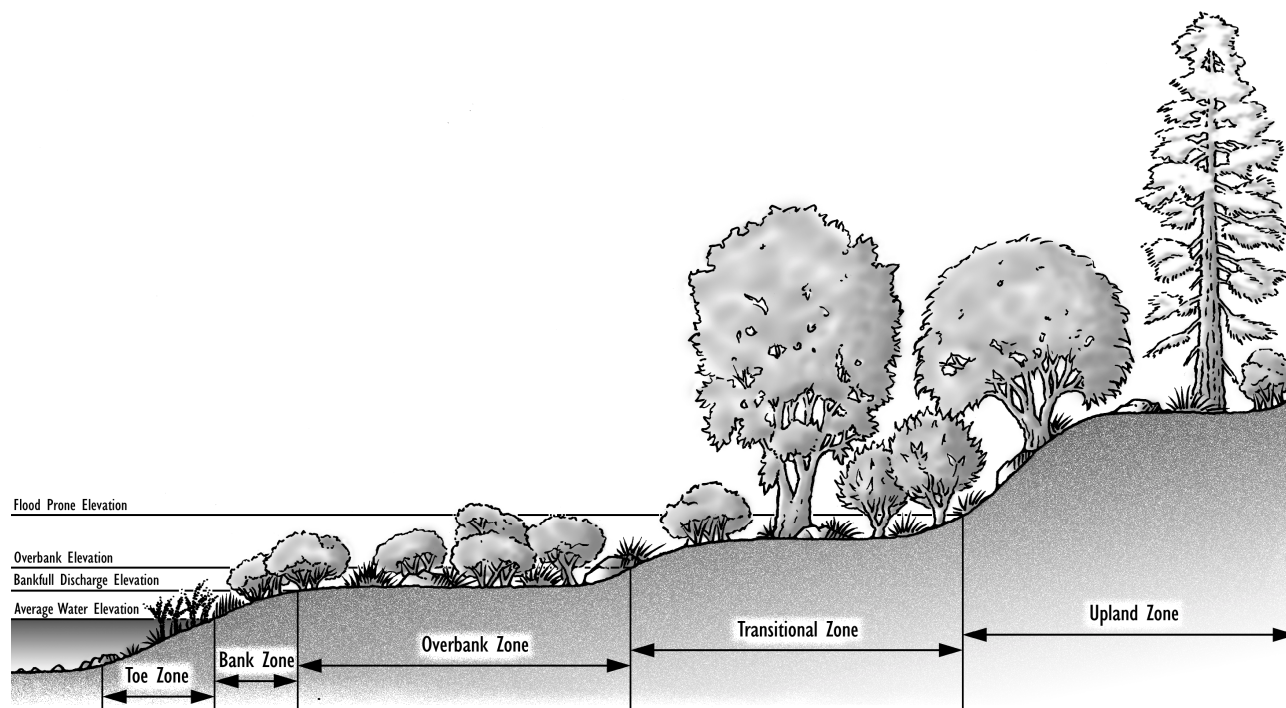
PURPOSE

- To stabilize channel banks and adjacent areas and reduce erosion and sedimentation using vegetation.
- To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to establishing vegetation on channel banks, berms, spoil, and associated areas. **This practice does not apply to Field Office Technical Guide (FOTG), Section IV, Practice Standards and Specifications, 412–Grassed Waterways, ephemeral channels, diversions and areas with protective linings; those covered with water for an extended period, or in areas where conditions will not support adequate vegetation.**

ILLUSTRATION 1. HYDROLOGIC ZONE



NOTE: This type of font (AaBbCcDdEe 123..) indicates NRCS National Standards.
This type of font (AaBbCcDdEe 123..) indicates Montana Supplement.

Channel bank hydrologic zones are used when selecting vegetative species. The four hydrologic zones are the Toe, Bank, Overbank, and Transitional Zone. Each zone has vegetation that is specifically adapted to that location in the channel. See illustration (1), for zone locations. (Note some channels have less than four hydrologic zones based on soils, topography, entrenchment and/or moisture regime.

CRITERIA

FOTG, Section IV, Practice Standard 580–Stream-bank and Shoreline Protection shall be used when stabilization of the Toe and/or Bank Hydrologic Zones is required before channel vegetation establishment.

Non point source pollution from nutrients, pesticides and sediment will be controlled.

Protection for any state and federally listed or candidate endangered and threatened species will be incorporated.

Side Slopes

Side slopes shall be stable permitting establishment and maintenance of desired vegetation.

- When slopes are modified for seeding, topsoil will be stockpiled and spread over areas to be planted as needed to meet planting and landscaping needs.
- Areas to be planted will be cleared of unwanted materials and smoothed or shaped, if needed, to meet planting and landscaping purposes.
- Side slopes on streambanks to be used for public swimming, bathing, or wading will be no steeper than 4:1.
- Herbaceous plantings will be limited to slopes of 3:1 or flatter. Slopes steeper than 3:1 will have combinations of woody vegetation or structural controls before herbaceous vegetation can be used.
- Woody species planted as containers, balled, potted, plugs, paper sleeves, or bare rootstock will only be planted on stable banks on slopes of 2:1 or flatter. Plant materials should be planted on modified microsites such as scalped areas or small terraces.

Species Selection

Specified seed, vegetative material, planting rates, spacing, methods of planting and date of planting shall be consistent with documented guidance cited by research and demonstration trials for achieving satisfactory establishment. Propagation techniques and species selection can be found in the FOTG, Section IV, Practice Standards, 342–Critical Area Planting, 391–Riparian Forest Buffer, 512–Pasture and Hayland Planting, and 550–Range Planting. NRCS Montana Technical Note 34 lists woody species by hydrologic zone.

Plant species and their cultivars shall be selected based on hydrologic zones as well as:

- Climatic conditions, such as annual rainfall, seasonal rainfall patterns, growing season length, temperature extremes, USDA Plant Hardiness Zones or Major Land Resource Areas (MLRA).
- Soil condition and position attributes such as bank stability, side slopes, soil texture, pH, available water holding capacity, slope, aspect, shallow depth, restrictive pans, inherent fertility, salinity, alkalinity, acidity, drainage class, flooding, ponding, and severe levels of toxic elements that may be present such as selenium and aluminum.
- Plant resistance to disease and insects common to the site or location.
- Range sites, ecological sites and forest habitat types in the FOTG, Section II, Rangeland, Grazed Forestland, and Native Pastureland Interpretations.
- Providing a lasting cover to protect the channel area and to help maintain the channel design capacity.
- Hydrologic conditions such as fluctuating water table, flooding (peak flows), time of flows, ice conditions, flood frequency, sediment loads, duration of high flows, velocities, position, stream channel type, and channel capacity.
- Identify, mark, and protect desirable existing vegetation during practice installation.
- Growth & life form and characteristics that best fit the planting zone and accomplish the objective will be used, such as (shrubby

- vegetation and tree form vs. creeping or rhizomatous herbaceous and shrubby vegetation).
- Rhizomatous woody species will be planted adjacent to the bankfull discharge water line.
- Shrub species will be planted up-slope from the bankfull discharge waterline in the upper portion of the Bank Zone and in the Overbank Zone. Willows will be planted so roots are accessing the dry season water table and/or capillary fringe.
- Dormant unrooted cuttings will be used on steep side slopes and in unstable areas where banks are stabilized by structures. These cuttings regardless of location must extend below the average waterline.
- The existing vegetation will be cleared in a three foot diameter around each site where container, balled, potted, plug, paper sleeve and bareroot stock plantings are to be planted.
- Herbaceous and woody plantings in and above the Transitional Zone will be based on local site conditions. See the FOTG, Section IV, Practice Standards, 342–Critical Area Planting, 391–Riparian Forest Buffer, 512–Pasture and Hayland Planting, 393–Filter Strip, and 550–Range Planting.
- Herbaceous seedbeds will be shaped and firmed as needed. All seedbeds will be free from growing weeds. Seedbeds will be scarified if drilled, or roughed if broadcast. Compacted layers will be ripped and re-firmed.
- Herbaceous seeds will be planted using a drill, hand planter, or suitable broadcast method. The area will be hand raked or dragged with a chain or harrow, after seeding, until good seed-soil contact is obtained when seed is broadcast. Seed planted with a drill will be planted at the depth specified for the individual species.
- Sod plantings will be limited to areas that can naturally supply needed moisture or sites that can be irrigated during the establishment year.
- Sod placement will be in a brick-laying fashion so joints are alternated. Sod strips

will be placed tightly together and rolled with a heavy roller to remove air pockets and improve sod to soil contact.

- Providing plant species diversity will help combat disease and the overuse of a single species.

All commercial seed and planting materials shall be labeled and meet state seed quality law standards. See the FOTG, Section I, State and Local Laws, Ordinances, and Regulations. Certified seed use will be encouraged.

Bioengineering practices are to be used when velocities, soils, and bank stability are not adequate for vegetative establishment alone. See The Practical Streambank Bioengineering Guide.

Some conditions may require structural practices to aid in establishing channel vegetation. See the FOTG, Section IV, Practice Standards, 580–Streambank and Shoreline Protection, 584–Stream Channel Stabilization, and 582–Open Channel.

Fertilizer and Soil Amendments

If fertilization is considered, soil tests will be made on the cut and fill areas where grasses and forbs are to be established. Fertilizer application rates will be based on the soil tests. When needed, applications will occur during planting to encourage rapid vegetative establishment for land protection and erosion control. Fertilizer will not be applied when salvaged topsoil is used as a seedbed.

Apply fertilizers and soil amendments in accordance with soil analysis and plant requirements identified in the FOTG, Section IV Practice Standard, 590–Nutrient Management.

Applications of nutrients will be made at a time when the potential for runoff and leaching is low.

Mulching

Apply mulch materials if needed for establishing vegetation. When specified, mulch will be anchored in place. Tackifiers, woven netting, and wooden or wire stakes will be used to anchor mulch when slopes are too steep to use equipment on the site. See the FOTG, Section IV, Practice Standard 484–Mulching.

Protection and Access Control

Access to planted areas will be controlled for a minimum of two years during the establishment period so newly planted vegetation is not trampled, uprooted, or grazed.

A prescribed grazing plan is required when channel vegetation is in a grazing area. Grazing will be excluded for the first two years of vegetation establishment. See FOTG, Section IV, Practice Standard, 528A—Prescribed Grazing. On sites where grazing cannot be controlled, the newly vegetated areas will be fenced to exclude livestock.

Tree guards will be placed around poles, cuttings or other plantings as needed to protect against animal damage.

CONSIDERATIONS

Straw is the preferred mulch but needs to be anchored in place with equipment such as rollers and crimpers. Steep areas will be netted to hold straw in place. Wheat straw deteriorates less rapidly than other small grains and results in less volunteer growth compared to barley and oat straw. Use clean weed free straw to minimize the spread of noxious weeds.

Stable, overhanging banks that provide shade and cover for fish should not be disturbed.

Channel stabilization and streambank protection practices should be considered to facilitate establishment of channel vegetation.

Control channel access, as needed during the establishment period, by fencing or by other means to protect slopes and vegetation from damage.

A riparian functional assessment should be completed on live streams to determine channel condition. This process should be conducted before evaluating related resources such as fisheries and wildlife habitat. The USDI—Bureau of Land Management's *Proper Functioning Condition* is one of several accepted methodologies.

In constructed channels, consider the size of vegetation at maturity so as not to restrict the capacity of the channel or conflict with surrounding uses. In natural systems, vegetation practices will be designed to closely resemble natural riparian communities.

Consider the use of vegetative buffers such as seen in the FOTG, Section IV, Practice Standard, 393A—Filter Strip. This practice applied in conjunction with Channel Vegetation will improve water quality and enhance wildlife habitat.

The use of local herbaceous and woody species for seed or planting stock is encouraged.

Where economically feasible and practical, irrigation of new plantings should be considered.

Protection of channel vegetation from upland sediment deposits resulting from wind and water erosion should be considered.

Provisions for safety and protection of human life and property should be considered in all aspects of design, application, and maintenance.

Consider economic and resource costs of practice failure or re-establishment.

Effects of vegetation on water budget components, especially on volumes and peak flows of runoff, should be considered.

Techniques to minimize sedimentation impacts from practice installation, such as sediment barriers, erosion control fabric, and biodegradable mulches, should be considered.

Effects of woody vegetation on stream temperatures should be considered.

DEFINITIONS

BANKFULL DEPTH—The maximum depth at a section measured at bankfull discharge.

BANKFULL DISCHARGE—In natural streams, it is the discharge that fills the channel without overflowing onto the flood plain and determines the stream's geomorphic dimensions and form. Bankfull discharge of natural streams tends to have a recurrence interval of one to two years based on the annual flood series.

BANKFULL STAGE—The elevation of the water surface associated with the bankfull discharge.

BANKFULL WIDTH—The stream width at bankfull discharge.

BANK ZONE—That area above the Toe Zone located between the average water level and the bankfull discharge elevation.

ENTRENCHMENT—The vertical containment of a channel and the degree to which it is incised in the valley floor.

FLOOD PRONE WIDTH—The width measured at an elevation, which is determined at twice the maximum bankfull depth.

OVERBANK ZONE—The area located above the bankfull stage elevation continuing upslope to an elevation equal to two thirds of the flood prone depth

TOE ZONE—The portion of the bank that is between the average water level and the bottom of the channel, at the toe of the bank.

TRANSITIONAL ZONE—That area located between the OVERBANK ZONE, and the flood prone width elevation.

PLANS AND SPECIFICATIONS

Plans and designs are to be prepared for specific field sites. The plan will identify site conditions, required permits, and include design drawings showing location of planned measures, cut and fill cross sections, requirements for site preparation, location of planned species, planting dates, planting methods, plant spacing, planting depth, mulching,

fertilizer and irrigation requirements. A management strategy protecting the site will be in place prior to the installation of Channel Vegetation improvements. See *The Practical Streambank Bioengineering Guide*.

Specifications will be completed for each hydrologic zone located within the channel.

OPERATION AND MAINTENANCE

Maintenance for this practice includes the following:

- Management of vegetative growth, as applicable, by mowing, controlled grazing, applying approved pesticides and fertilizer, or other means to maintain the desired cover. Vegetative removal will be restricted to periods having the least impacts on nesting wildlife. All species shall be allowed adequate time for re-growth in order to provide winter cover.
- Beaver and other rodents will be controlled as needed to protect establishment and growth of vegetation. Controls will meet requirements of the Montana Department of Fish, Wildlife and Parks.
- Repair of appurtenances and fences will be completed as needed.

REFERENCES

Montana Interagency Plant Materials Handbook, Montana State University Extension Service, EB 69, April 1993.

The Practical Streambank Bioengineering Guide, USDA–Interagency Riparian/Wetland Plant Development Project, May 1998.

USDA Plant Hardiness Zone Map, USDA–ARS, Miscellaneous Publication No. 1475, January 1990.

USDA–Natural Resources Conservation Service, Technical Note No. 34, Users Guide To Description, Propagation and Establishment Of Native Shrubs And Trees For Riparian Areas In The Intermountain West, May 1999.

USDA–Natural Resources Conservation Service, Field Office Technical Guide, Section I, State and Local Laws, Ordinances, and Regulations, February 1999.

USDA–Natural Resources Conservation Service, Field Office Technical Guide, Section II, Rangeland, Forestland, Pastureland, Interpretations.

USDA–Natural Resources Conservation Service, Field Office Technical Guide, Section IV: Practice Standards and Specifications:

- 342–Critical Area Planting, July 1989.
- 393A–Filter Strip, April 1998.
- 484–Mulching, February 1993.
- 590–Nutrient Management, June 1998.
- 582–Open Channel, July 1989.
- 512–Pasture and Hayland Planting, March 1999.
- 528A–Prescribed Grazing, February 1996.
- 550–Range Planting, September 1997.
- 391–Riparian Forest Buffer, July 1998.
- 584–Stream Channel Stabilization, July 1989.
- 580–Streambank and Shoreline Protection, September 1999.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.